

# Memorandum

DATE: FEB 20 2007

REPLY TO  
ATTN OF: EM-60 (Dr. James M. Shuler, 301-903-5513)

SUBJECT: Revision 11, DOE Certificate of Compliance No. 9932 for the UC-609 Package

TO: Sarah E. Spagnolo, Livermore Site Office

Attached is Revision 11 (with Approval Record) of DOE Certificate of Compliance No. 9932 for the UC-609 package. The certificate has been revised because of an error was made with Revision 10. For Revision 10, the identification plate on UC-609 was changed to meet the requirements of 49 CFR 172.310(d) which requires the marking of radioactive material trefoil symbol on Type B(U) and B(M) packages. One of the page changes for this change was the cover page of the SARP. This change to the cover page made the SARP Revision 3 and changed the date to March 2006. The Revision 10, incorrectly reference Revision 2 of October 2002 of the SARP. Revision 11 corrects this error. Per your request, the certificate holder was changed from Oakland Operations Office to Livermore Site Office. The expiration date remains August 31, 2011.

If you have any questions, please call Dr. James Shuler at 301-903-5513.



Dae Y. Chung  
Headquarters Certifying Official  
Deputy Assistant Secretary for  
Safety Management and Operations  
Office of Environmental Management

Attachment

cc w/att.:  
James M. Shuler, EM-60  
Paul Mann, NA-124

U.S. DEPARTMENT OF ENERGY  
CERTIFICATE OF COMPLIANCE  
For Radioactive Materials Packages

1a. Certificate Number	1b. Revision No.	1c. Package Identification No.	1d. Page No.	1e. Total No. Pages.
9932	11	USA/9932/B(U) (DOE)	1	5

2. PREAMBLE

- 2a. This certificate is issued under the authority of 49CFR Part 173.7(d).
- 2b. The packaging and contents described in item 5 below meet the safety standards set forth in subpart E, "Package Approval Standards" and subpart F, "Package and Special Form Tests" Title 10, Code of Federal Regulations, Part 71.
- 2c. This certificate does not relieve the consignor from compliance with any requirement of the regulations of the U.S. Department of Transportation or other applicable regulatory agencies, including the government of any country through or into which the package will be transported.

3. This certificate is used on the basis of a safety analysis report of the package design or application --

(1) Prepared by (Name and address):

(2) Title and Identification of report or application:

(3) Date:

U.S. Department of Energy, NNSA  
Livermore Site Office  
7000 East Avenue, B-311  
Livermore, CA 94551-0808

Safety Analysis Report for  
Model UC-609 B(U) DOE Shipping Package,  
UCRL-ID-111494, Rev. 3

March 2006

4. CONDITIONS

This certificate is conditional upon the fulfilling of the applicable Operational and Quality Assurance requirements of 49CFR parts 100-199 and 10CFR Part 71, and the conditions specified in item 5 below.

5. Description of Packaging and Authorized Contents, Model Number, Transport Index, Other Conditions, and References:

(a) Packaging

(1) Model Number: UC-609

(2) Description

The UC-609 package consists of a containment vessel centered by Celotex insulation inside a 100-gallon drum. The tritium contents are carried in a storage vessel inside the containment vessel. The package gross weight is 226.8 kg (500 lb).

The drum has a maximum diameter of 63.5 cm (25.0 in) and a total height of 138.4 cm (54.5 in). The drum is the open head type with a flat cover secured by eight J-shaped brackets rather than the locking ring typically used with open head drums. Rotation of the drum cover is prevented by means of a 10-32 UNF stainless steel set screw installed through a tapped hole on the underside of each bracket. The drum is fabricated of 14 gauge (0.19 cm) 304 stainless steel to Military Standard MS 27683. To vent the drum, no gasket is used between the cover and drum body and, in addition, there are four 0.64-cm (0.25-in) holes evenly spaced around the drum body 5.1 cm (2.0 in) below the cover. The vent holes are sealed weather tight by pressure-sensitive

6a. Date of Issuance: FEB 20 2007

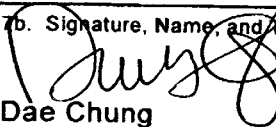
6b. Expiration Date: August 31, 2011

FOR THE U.S. DEPARTMENT OF ENERGY

7a. Address (of DOE Issuing Office)

U.S. Department of Energy  
Office of Environmental Management, EM-60  
1000 Independence Avenue, SW  
Washington, DC 20585

7b. Signature, Name, and Title (of DOE Approving Official)

  
Dae Chung  
Headquarters Certifying Official  
Deputy Assistant Secretary for  
Safety Management and Operations

adhesive tape.

The drum is lined with ASTM C 208 roof-grade Celotex insulation board. The minimum thickness of the lining is 7.2 cm (2.85 in). The insulation disks at the top of the drum are supported by a plywood disk that forms the top containment vessel cavity and rests on the annular disks lining the drum sides.

Protecting the Celotex disks next to the drum cover is a bottle-cap shaped heat shield of 304 stainless steel. The heat shield is cemented to the outer surface of the Celotex. Between the drum cover and the metal heat shield is a 1.3-cm (0.5-in) thick disk of Alumina-silica ceramic fiber (Cerafelt) produced by Thermal Ceramics Company.

The containment boundary for the UC-609 Shipping Package is a cylindrical vessel with semi-elliptical dished heads. The containment vessel is made of 316 stainless steel. The containment vessel is 45.7 cm (18 in) in diameter, 111.9 cm (44.06 in) long and is rated for service at 760 kPa gauge at 145°C (110 psig at 293°F). The containment vessel is fabricated, examined, and tested equivalent to Section III, Subsection NB of the ASME Boiler and Pressure Vessel Code.

Access into the containment vessel is through a flange that secures the top head to the vessel body. The flange is closed by eight 3/8-in bolts of A 286 alloy fabricated to the Aerospace Material Specification (AMS) 5726. Tightening these bolts to 45 foot-pounds torque drives opposing knife edges on the cover and vessel body flanges into a copper gasket forming a metal-to-metal seal. The copper gasket is 0.20 cm (0.080 in) thick made to ASTM B 152 H01 temper (quarter hard). Outside the copper gasket is a silicone O-ring. A port to the space between the copper gasket and the silicone O-ring enables leak testing of the copper gasket.

Also providing access to the containment vessel is a NUPRO bellows valve that is part of the containment boundary. The valve is used to fill the containment vessel with helium for leak testing and to sample the containment vessel. This fill valve is of 316 stainless steel. The fill valve is located at the center of the removable top head and is welded to the top head and to a valve chamber that protects the fill valve. This protective valve chamber is a two-piece cylindrical enclosure. The lower half is welded to the top head and the valve. The upper half of the valve chamber is screwed to the lower half and sealed with an O-ring of ethylene propylene elastomer, ASTM D 2000 M3BA708A14B13F17. The protective valve chamber may be sampled through another NUPRO bellows valve that is welded to its lower half.

The internal cavity available for carrying the storage vessel is 25.4 cm (10 in) diameter by 78.7 cm (31 in) long. The internal cavity is lined by an aluminum tube. The annular space between the aluminum tube and the containment vessel wall is filled with 0.05 g/cc (3.4 lb/ft<sup>3</sup>) aluminum honeycomb to absorb the impact of the storage vessel. The space between the ends of the internal cavity and both heads is also filled with 12.7 cm (5.0 in) thick cylindrical disks of aluminum honeycomb. Aluminum or stainless steel disks  $\geq 1.27$  cm ( $\geq 0.5$  in) thick are required at both ends of the internal cavity to distribute an impact load over the entire surface of the cylindrical honeycomb disks.

### (3) Drawings

The UC-609 package is constructed in accordance with Lawrence Livermore National Laboratory Drawing Numbers:

AAA92-102223, Rev. OE - Shipping Container Assembly  
AAA75-113083, Rev. OG - Containment Vessel Assembly  
AAA91-109841, Rev. OB - Containment Vessel Cover Assembly  
AAA77-104161, Rev. OC - Container Insulation Cover Assembly  
AAA91-107485, Rev. OC - Drum Assembly  
AAA91-109803, Rev. OA - Valve Assembly  
AAA77-104603, Rev. OE - Identification Plate

(b) Contents

(1) Type and Form of Radioactive Material

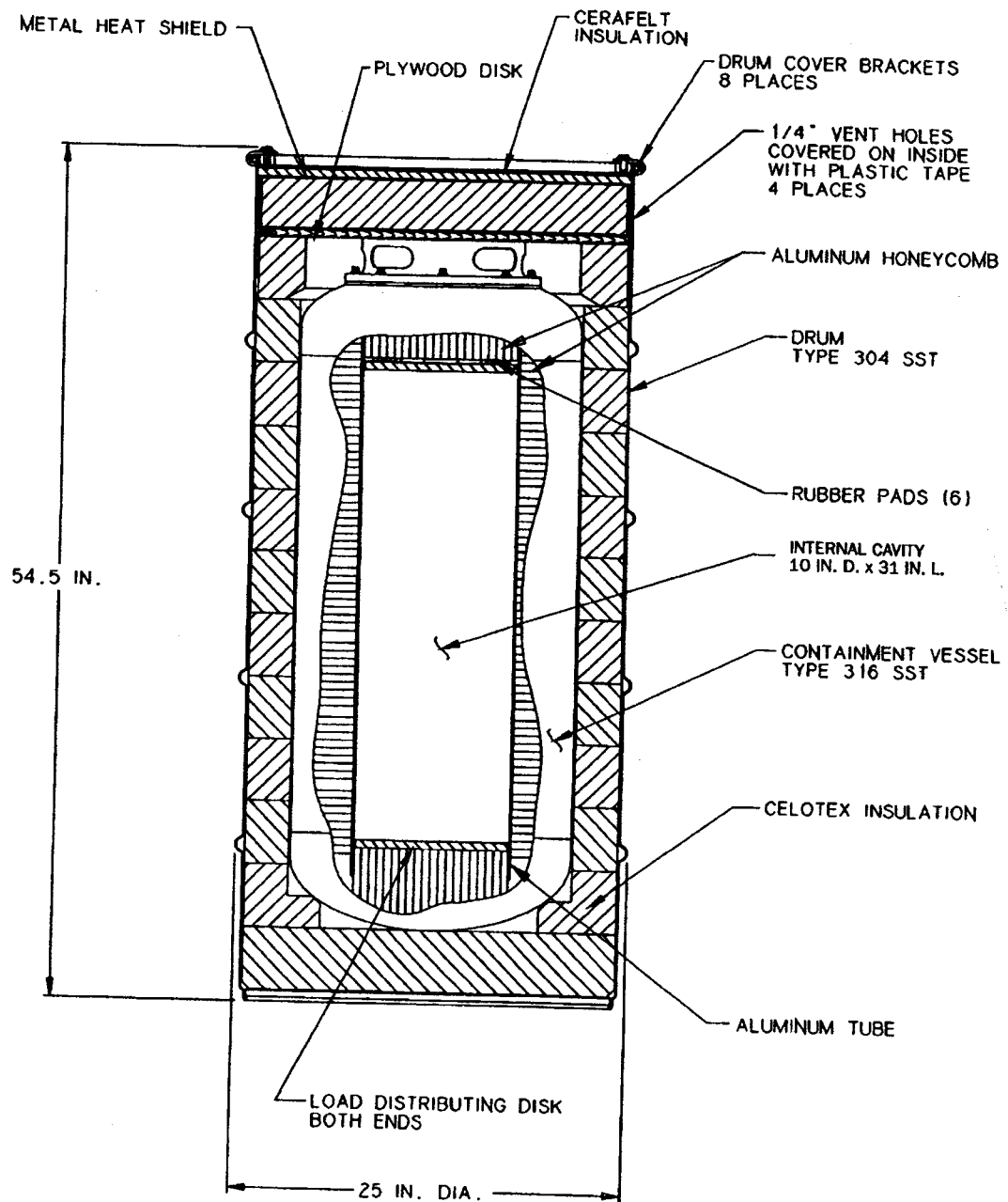
Tritium in the form of gas, tritiated water, or metal tritides, contained in a storage vessel.

(2) Maximum Quantity of Radioactive Material per Package

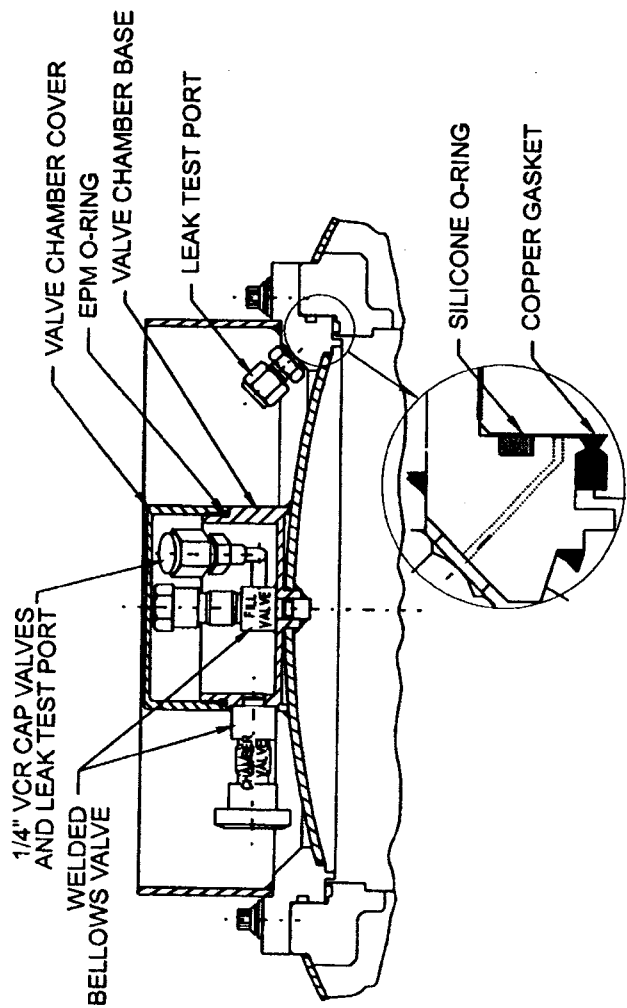
Not more than 100 grams of tritium with the decay heat not to exceed 32 watts.

(c) Conditions.

- (1) The UC-609 package shall be used and maintained to the requirements specified in Chapters 7, 8, and 9 of the SARP (application).
- (2) Aluminum or stainless steel load distributing disks  $25.08 \pm 0.08$  cm ( $9.875 \pm 0.03$  in) diameter and at least 1.27 cm (0.5 in) thick shall be fixed to either end of the contents.
- (3) The maximum weight of the contents (storage vessel with its appurtenances and the load distributing disks) shall not exceed 54.4 kg (120 lb).
- (4) The length of the contents and load distributing disks shall not be less than 0.48 cm (0.188 in) shorter than the nominal 79 cm (31 in) length of the cavity. The diameter of the contents shall not be more than the diameter of the load distributing disks nor less than 0.48 cm (0.188 in) smaller than the diameter of the load distributing disks.
- (5) The storage vessel shall be in a form to allow evacuation of the containment vessel to 21 kPa (3 psia).
- (6) The storage vessel shall be in a form to allow pressurization of the containment vessel to 760 kPa (110 psig).
- (7) The O<sub>2</sub> content shall be less than 5% by volume of the gas in the containment vessel.
- (8) Contents that can cause chemical or galvanic reactions with the containment boundary are not allowed.
- (9) The maximum internal pressure of the containment vessel shall not exceed 760 kPa gauge at 145°C (110 psig at 293°F) including the contributions of any tritium chemical form that vaporizes or solid carrier that generates a vapor pressure as well as the fixed gases in the containment and storage vessels.
- (10) If the package is not shipped within one year of loading, the internal pressure of the containment vessel shall be redetermined to account for the decay of tritium into helium.
- (11) The UC-609 package containing tritium in storage vessels may be shipped non-exclusive use by all modes of transportation.



*Model No. UC-609 Shipping Package*



CONTAINMENT VESSEL COVER



# Department of Energy

Washington, DC 20585

FEB 20 2007

## PACKAGE CERTIFICATION APPROVAL RECORD

Certificate of Compliance USA/9932/B(U) (DOE), Revision 11  
UC-609

Docket 07-21-9932

Revision 11 of Certificate of Compliance USA/9932/B(M) (DOE) for the UC-609 was issued because the Revision 10 referenced the incorrect revision number and date of the SARP. Revision 11 references Safety Analysis Report for Packaging for Model UC-609 B(U) DOE Shipping Package, UCRL-ID-111494, Rev. 3, March 2006. This revision also changed the certificate holder from Oakland Operations Office to the Livermore Site Office. The expiration date remains August 31, 2011.

Changes to the certificate are indicated by a vertical line in the margin.

This certificate constitutes authority for the Department of Energy to use the UC-609 package for shipment of the authorized contents under 49 CFR 173.7(d).

Dae Y. Chung  
Headquarters Certifying Official  
Deputy Assistant Secretary for  
Safety Management and Operations  
Office of Environmental Management

Date: 2/20/07

